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Opportunities and Obstacles to Reducing the
Environmental Footprint of Natural Gas
Development in Uintah Basin (October 14)

2010

10-14-2010

SLIDES: Enhanced Reclamation Program

Stephanie Tomkinson

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QEP Energy Company

Enhanced Reclamation Program

Presented By:
Stephanie Tomkinson
Senior Biologist
October 14, 2010

Environmentally Friendly Drilling (EFD) Workshop

Vernal, Utah

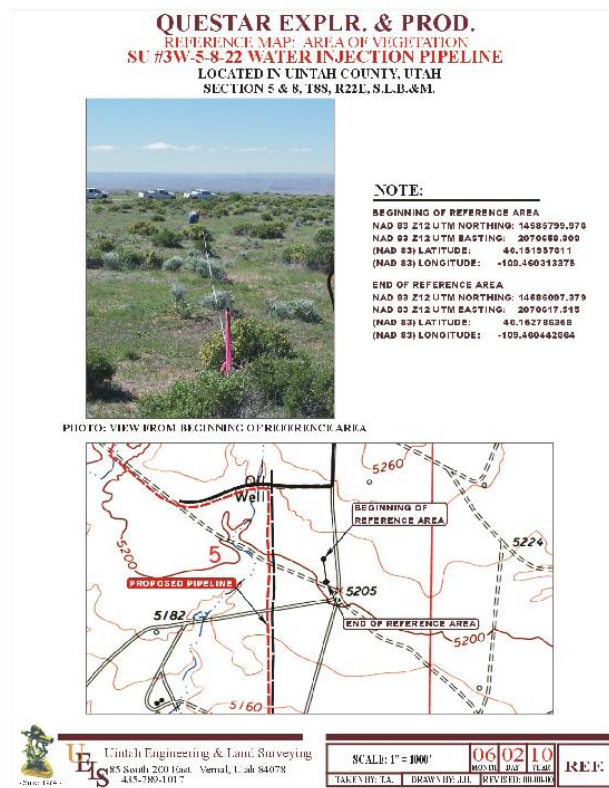
Enhanced Reclamation Program



- Reclamation Plan
 - Pre-disturbance Planning
 - Recontour
 - Reclaim
 - Monitor
 - Remediate (when necessary)

Enhanced Reclamation Program

Pre-disturbance Planning



- Reclamation Plan
 - Internal Goals
- Reference Sites

Reclamation Process



- Empty and backfill reserve pit

Reclamation Process



- Rip to relieve compaction

Reclamation Process



- Recontour

Reclamation Process

- Spread topsoil



Reclamation Process

- Establish drainage



RW 14-20B

Plugged and Abandoned June 2008

Reclaimed Fall 2008



RW 14-20B

July 6, 2010 2nd Growing Season

Creative Dirt Work and Landscaping

Carefully and strategically placed shot rock and juniper litter.



**RW 34-27ADR , Red Wash
Field, Uintah County, Utah**



**FR 9P, Flat Rock Field, Uintah
County, Utah**



Erosion Control

MHA 1-06-31H

9/21/2010



SCT 6G-12-7-22

Red Wash Field

Uintah County, Utah

P&A Location - Reclaimed 6/2008

Photographed 6/2009 - 1 Growing Season



Snow Fence



Sparks Ridge 1: February 12, 2008

1st winter after fall planting and installing snow fence

Hiawatha, Colorado

Snow Fence



Sparks Ridge 1: July 8, 2008

1st growing season - effects of snow fence

Hiawatha, Colorado



Sparks Ridge 1: June 23, 2009

2nd growing season - effects of snow fence

Hiawatha, Colorado

Soil Amendment: Gypsum

Disced into top 3" of soil.



Straw Mulch

Straw mulch being applied with hay-buster.





Nutrients * Moisture Retention * Erosion Control * Shade

Matting

Matting on steep slopes to help control erosion.



RWS 10ML-5-9-24, Red Wash Field, Uintah County, Utah

Imprinting

Moisture retention and erosion control.



Imprinting



Reclamation Enhancements

2007



2010



Shrub Islands

Sparks Ridge Unit 1, Moffat County, Colorado

Enhanced Seed Mix

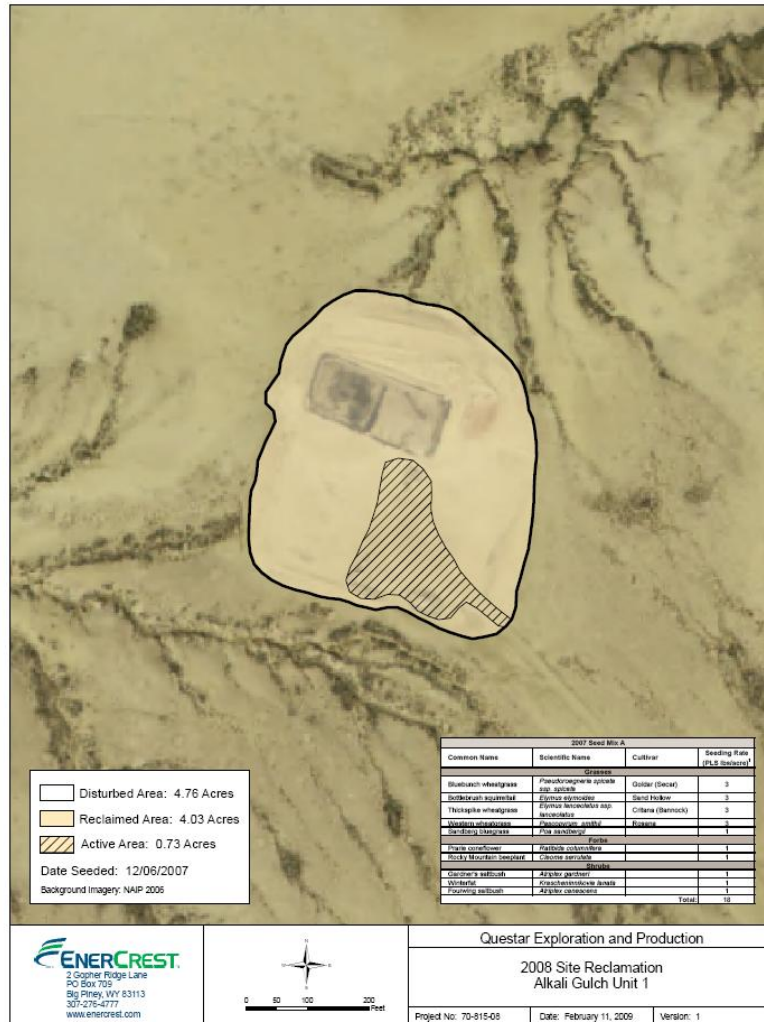


Rocky Mountain Bee Plant, *Cleome serrulata*

Enhanced Seed Mix



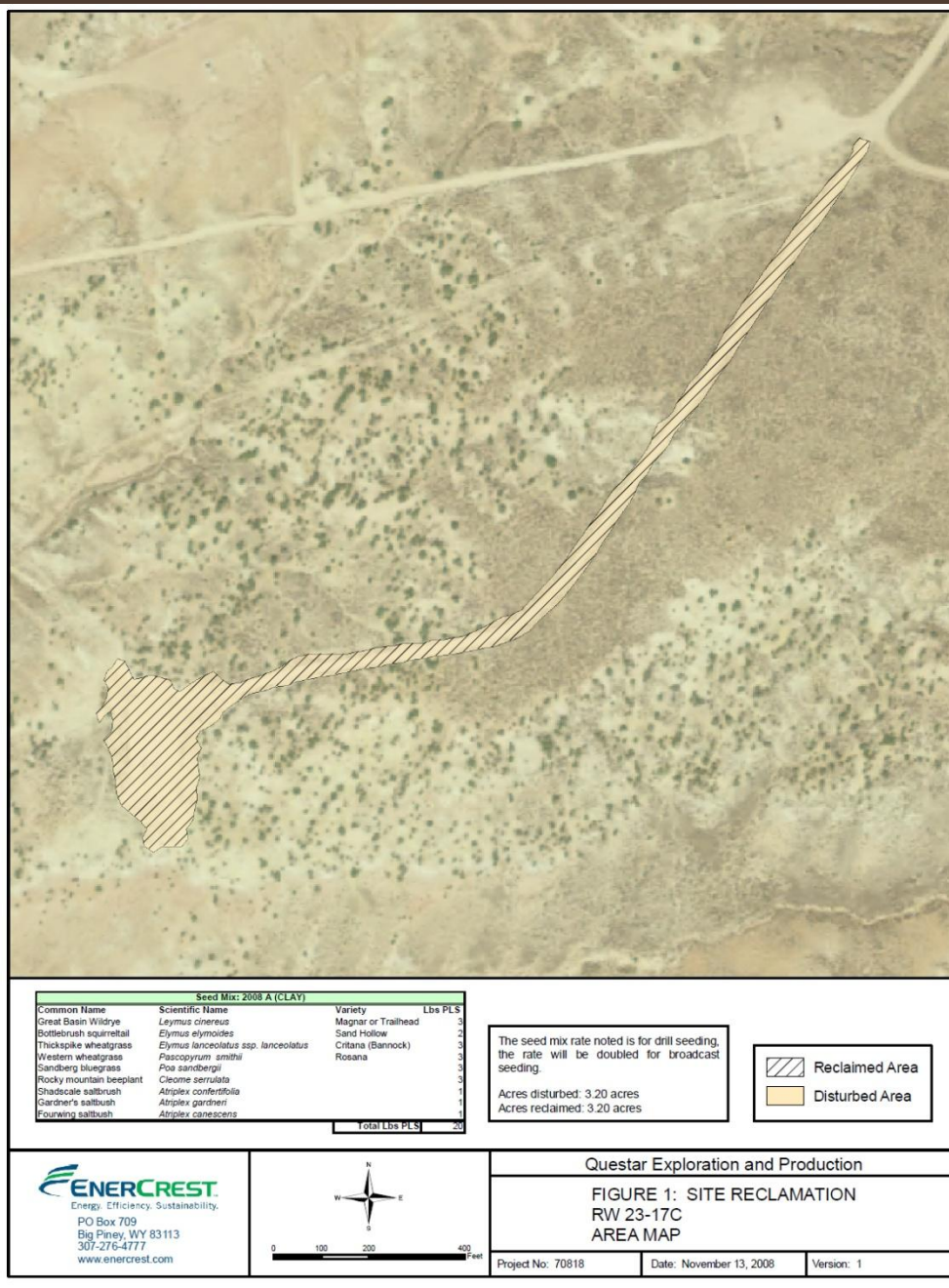
Long Term Tracking: Recording



- Record
 - Disturbed area
 - Reclaimed area
 - Active area
 - Seed mix and rate
 - Dates

Long Term Tracking: Monitoring

- Reclamation Map and Information



Long Term Tracking: Monitoring

- Monitor
 - Site Information
 - Vegetation Assessment
 - On Site and Off Site
 - Other Observations
 - Reclamation Assessment
 - Recommendations

Questar Exploration and
Production Company

QUESTAR

2008 Reclamation Monitoring Report: Dripping Rock 6

Site Information

Date Visited: 7/25/2008
Field: Wamsutter
Status: Interim Reclamation

Total Disturbed Area (ac): 2.46
Active Area (ac): 1
Reclaimed Area (ac): 1.46

Daubenmire Frame Vegetation Assessment

| Type | Canopy Cover | |
|-----------------------------|--------------|--------------|
| | On Site (%) | Off Site (%) |
| Grass | 2.8 | |
| Forb | 0.1 | 1.1 |
| Shrub | 15 | 7.9 |
| Total | 15.1 | 9 |
| Weed | 0.1 | |
| Major Weed Species On Site: | | |
| Halogeton | | |



Other Observations

Erosion Features: None observed
Erosion Control BMPs: Diversion ditch and surface roughening
Evidence of Grazing: Wildlife
Fencing: None

Reclamation Assessment

| Criteria | Current Value | Required Value | Criteria Met |
|--|---------------|----------------|--------------|
| Relative Canopy Cover $= ((\text{On site vegetation cover}) / (\text{Off site vegetation cover})) \times 100$ | 167.8% | $\geq 70\%$ | Yes |
| Weed Criteria | 0.1% | $\leq 10\%$ | Yes |
| Surface Stability Class | Stable | Stable | Yes |
| Meets Reclamation Criteria | | | Yes |

Recommendations

Site Preparation: No action required.
Weed Control: No weed control recommended.
Seeding: No seeding required.
Erosion Control: No erosion control necessary.
Other: No additional recommendations.

KC HARVEY
Soil & Water Resource Consulting

Opportunities



Enhanced Reclamation = Enhanced Wildlife Habitat

WRU EIH 6MU-25-8-22, Glen
Bench Field, Uintah County, Utah

WV 11AD-14-8-21, Wonsits Valley
Field, Uintah County, Utah



Ponds

Ponds built while reclaiming locations.



Pronghorn at Water Hole

Awareness and Education



Awareness and Education

Reclamation + Functionality



Ditch Perimeter of Production Pad

RW 34-27ADR , Red Wash Field, Uintah County, Utah

Awareness and Education



USU Sociology Department – Field Tour – March 2010

2010 Earth Day Award Winner

- Recognition
 - Utah Division of Oil, Gas, and Mining
 - Uinta Basin Division
 - Enhanced Reclamation Plan



Temporary Footprint



Questions or Comments